



Mutant Cyborg Pumpkin

Halloween Costume

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TOOLS:

- [Dremel tool with cutting, grinding, or routing bits \(1\)](#)
- [Hot Glue gun & hot glue \(1\)](#)
- [Sharp knives \(1\)](#)
- [Soldering iron \(1\)](#)
- [Wire cutters \(1\)](#)



PARTS:

- [RJ-45 sockets \(simplest possible, no magnetics\) \(3\)](#)
- [UTP-5 cables \(3\)](#)
- [Hexagonal perf board \(1\)](#)
- [Voice changer kit \(1\)](#)
- [Cardboard boxes of various sizes \(1\)](#)
- [Bottle caps \(15\)](#)
[Some with bottle necks cut out](#)
- [Transparent tubing \(10ft\)](#)
- [Wire conduit \(3\)](#)
- [Krylon Indoor/Outdoor Spray Paint \(1\)](#)
- [Bondo \(1\)](#)
- [Plaster cloth \(1\)](#)
- [LEDs \(20\)](#)
- [Pumpkin lamp \(1\)](#)

SUMMARY

This year I decided to opt out from the boring practice of buying standardized Halloween costumes for my kids and instead build costumes myself. This Instructable is for the one I built for my son. I hope it is interesting not only because it is cool and unusual, but also as fun reading about different costume-making technologies.

The costume starts with an idea. I spent quite a while thinking what my 10-year-old boy might love. Star Wars trooper? Alien? Ninja? Well, I can probably make a decent Snow Trooper costume, but admit it: there are hordes of troopers out there on the streets and they are plain boring. I was looking for something that would stand out from the crowd; wild, ridiculous, having as much Halloween spirit as possible, and I was totally failing to come up with something cool. And when you, parents, can't solve a problem there is only one way to proceed: ask your child.

It appeared that he already had the idea fully baked and polished in his head and the idea was a CYBORG PUMPKIN! What can be more ridiculous and Halloweeny than a Cyborg Pumpkin? I don't know. I thought it was an awesome idea, so we both proceeded with discussing the implementation details right away.

Step 1 — Mutant Cyborg Pumpkin Halloween Costume



- Start with a large cardboard box. The longer side of the box should be slightly larger than the wearer's shoulder span. Cut out a round hole in that side so you can insert your head through it.
- Cut all parts of the box but three as shown in the picture. Make short cuts on the side with the hole so you can wrap that flap around your shoulders.

Step 2



- Glue a reasonably sized box to one of the flaps. This box will be a candy container integrated into the costume.
- Take a larger box and cut out most of one of its larger sides so you can easily put something inside that box.
- Glue this larger box to the other flap. This will be a backpack. Besides aesthetic it also has a practical function: It will contain most of the electronics and batteries.

Step 3



- Bend the main box so that overall it looks like a thorax. Conform it to your shoulders and glue the cardboard to fix it in this position.
- Take another smaller box and glue it to the container box. This will cover the bottom part of your body and work like a wide belt securing the entire combination of boxes on your body.
- After this step the armor should look as shown in the picture. Ignore the collar for now; we will add it later.

Step 4



- Decorate the costume with additional elements. For instance, you can use yoghurt containers, cardboard strips, pieces of styrofoam and so on.
- Add only larger pieces that you want to see as an integral part of the costume. Do not add small details at this time. Also, do not worry about the color of the elements.



Step 5



- In places where you need to smooth sharp corners, add some padding (like a piece of styrofoam).
- Cover the padding with several layers of plaster cloth. It's easier to apply the plaster cloth in small strips. Just dip it in water and put it over the padding.
- Plaster is a quick-curing material, so in just an hour you can get rid of all gaps and sharp corners in your costume.

Step 6



- Time to make your costume more waterproof and robust by covering it with a plastic surface.
- The two popular solutions that can help you to cover surfaces with plastic are Bondo and fiberglass resin.
- Fiberglass is a liquid with the consistency of corn starch. It is typically applied in combination with fiberglass cloth, but for this costume you can apply it directly on the cardboard. It cures in a few hours and forms a glossy surface that doesn't require sanding. The best way to apply it is to paint it on with a brush.
- Bondo has the consistency of putty and cures in 3-5 minutes forming a gray surface that typically requires sanding. The best way to apply it is with a credit-card-sized piece of plastic. I used Bondo for most parts of the costume because it cures faster.

Step 7



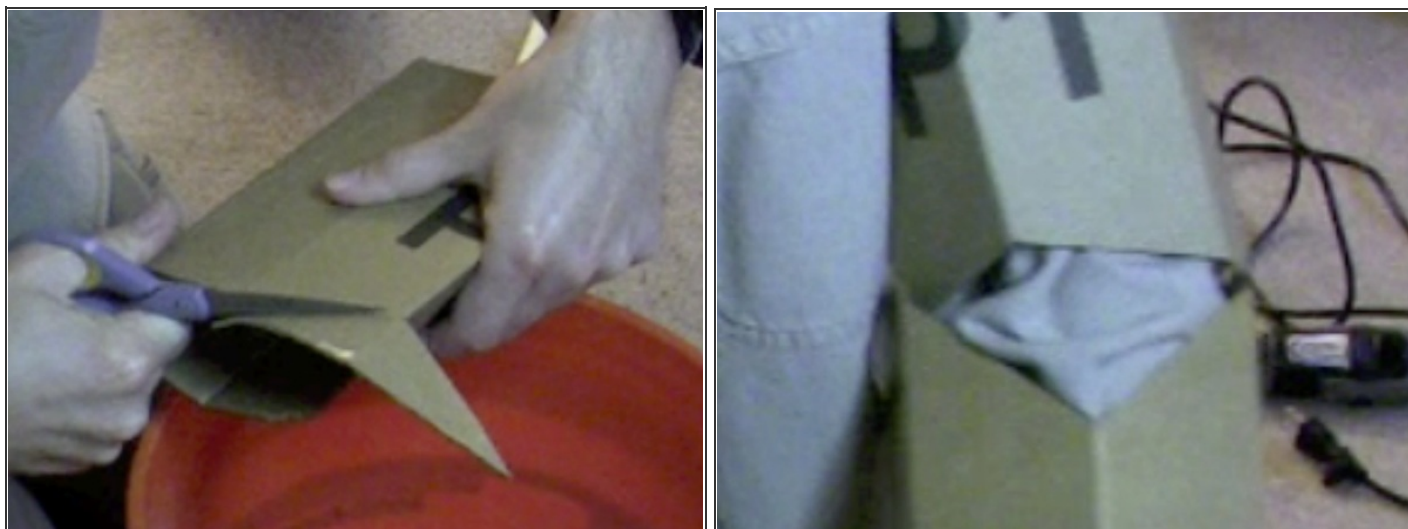
- Use the flaps cut from the larger boxes to make armor for your arms. You can bend these pieces of cardboard in any shape, but hexagonal seems the most interesting.
- Glue the cardboard along the edge, keeping the glue confined to a quarter-inch strip.
- The left lower section of the armor needs to be approximately twice as long as the right in order to accommodate an integrated weapon system.
- Glue smaller pieces of cardboard to the upper sections of the armor to cover deltas. Cut all sharp corners to make it look cooler.

Step 8



- In order to apply the Bondo, take approximately a half-cup of gray substance from the can and mix it with a tablespoon of red oxidizer from the tube.
- Keep mixing the two substances together until the mix turns into a uniform pinkish mass.
- Quickly apply the mix to the cardboard, trying to make the layer of Bondo as thin and as flat as possible.
- You only have 3-4 minutes to apply everything you mix. Once the mix starts curing, throw the excess away; do not try to use it. The picture shows the relatively smooth surface of the backpack – this is what it should look like. The surface on the flap was made with Bondo that had already started curing and it will require a lot of sanding to make it look OK.

Step 9



- If you put the arm armor on and try to bend your arm you will see that the two parts of the armor collide with each other. In order to avoid this, cut triangular sections off both pieces of armor. Check out the photos for details.

Step 10



- Give the armor 1-2 days to cure and dry completely. Cold, wet weather will make this process longer, so you can use a fan and a space heater to speed it up.
- Once the armor is ready, sand it to a smooth surface. I initially wanted a mirror-like surface (i.e., absolutely flat), but a partially-flat surface resembling molten steel appeared to look even better.
- Sandpaper, sponge and net are great tools for preparing the surface, but an oscillating power tool is probably the best.
- Please note that applying, sanding and painting Bondo require a respirator and, preferably, latex gloves and safety goggles.




Step 11



- Once sanding is complete and you have the surface and texture you like, prepare it for spray-painting. Choose a nice warm day or night and a good place outdoors that you can cover with cardboard boxes. Do not paint without a respirator, and do it in a well-ventilated area.
- Painting with spray paint is not difficult. Just spray and pray it will look good. :) Apply the paint in multiple thin layers rather than one thick coat. Also, paint the parts of the costume covered with plaster if you still have areas not covered with Bondo.

Step 12



- It takes at least one day for the paint to dry. Do not bring it home until then or the smell will make your life unpleasant. 
- Once the costume's smell goes away (at least, most of the smell), add the small elements to it.
- In the photo you can see that I glued back the collar (it made it very difficult to apply Bondo, so I ripped it off along with other small details), added a PCB on the front and a piece of plastic pumpkin to the back.

Step 13



- When my son tried on the costume it appeared that the back of his neck was not covered by the armor. I had to extend it with a large section of plastic pumpkin.
- Because hot glue instantly melts the foam pipe insulation used for the collar, I had to use a combination of Scotch tape, bobbins and wine corks to fix it perpendicular to the backpack.

Step 14



- Time to weaponize the cyborg. Most of its weapon will be integrated into that elongated section of left arm armor. Lefties will probably want to mirror this design. One way or another it's best to keep at least one hand available for safety reasons.
- Cut the front side of the armor diagonally to make it look cooler.
- Now, maintaining the same angle of approximately 20 degrees, drill two holes and insert a dowel into the armor like it is shown in the photo.
- The dowel will serve as a handle and it is more natural for your hand to hold a handle at an angle rather than vertically.

Step 15



- In order to make the entire weapon system more colorful I used LEDs of different colors. This complicated things a bit because every different type of LED required a different resistance, but in the end the effort paid off.
- The main weapon is made from a daylight lamp container tube. I used two bottle caps to install a flashlight inside. The flashlight uses a Cree Q5 LED and produces a ridiculously-bright beam of light.

Step 16



- The weapon mounted below the armor uses a 10mm blue ultra-bright LED. It is mounted inside a plastic tube, so it can be advanced or retracted.
- Both the white and blue weapons are installed on standoffs formed by the protruding ends of the handle dowel and two pieces of styrofoam.

Step 17



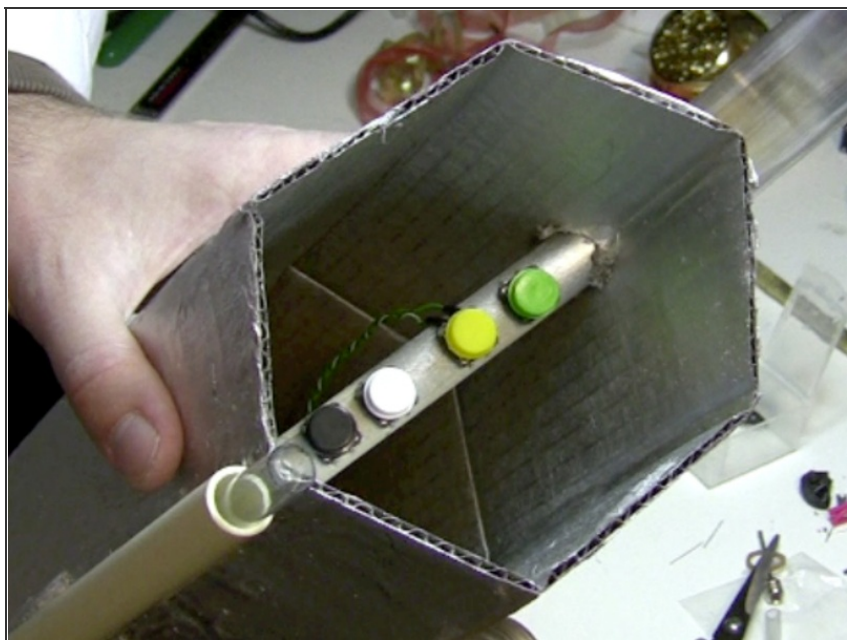
- The red weapon is mounted on the left side of the armor. It uses the same kind of large plastic tube as the main weapon, but this tube was blended with the armor when I was covering everything with Bondo. One part of the tube was masked with tape. I sanded this tape to make it semi-transparent.

Step 18



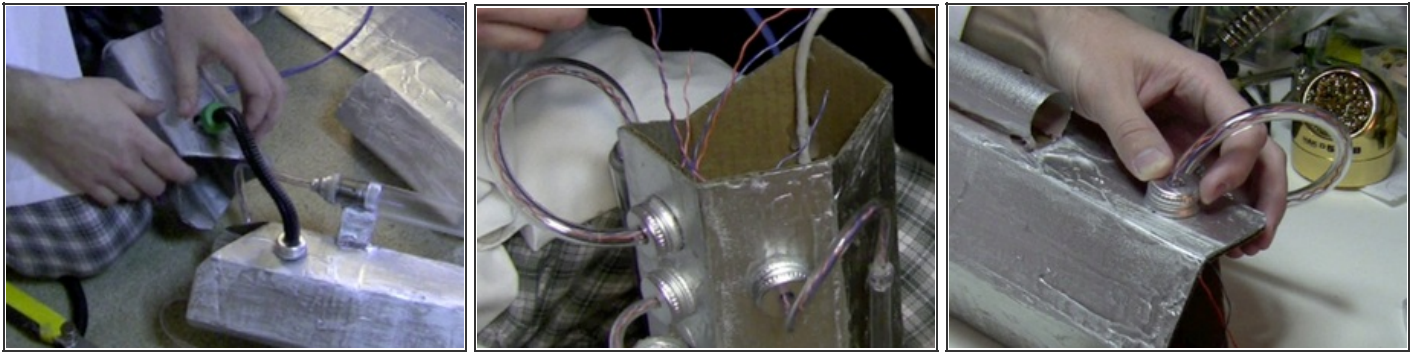
- Finally, six green LEDs are mounted inside the armor itself and covered with a lid made of a sanded plastic cookie-box lid. This makes the fourth weapon in this block.

Step 19



- On the handle I also mounted 4 buttons. They are not connected to the LEDs directly. Instead, all LEDs and buttons are soldered to one end of a UTB-5 cable that terminates with a regular RJ-45 connector and goes to the central hub located in the backpack.

Step 20



- The cables go to the backpack via a plastic conduit. Also, all tubing and the conduit itself enter the armor via aluminum bottle caps – this makes them look awesome. :)

Step 21



- All in all, I've got a very impressive and colorful weapon system. After all, it's easier to get a treat with a blaster and a kind word than it is with a kind word alone.

Step 22



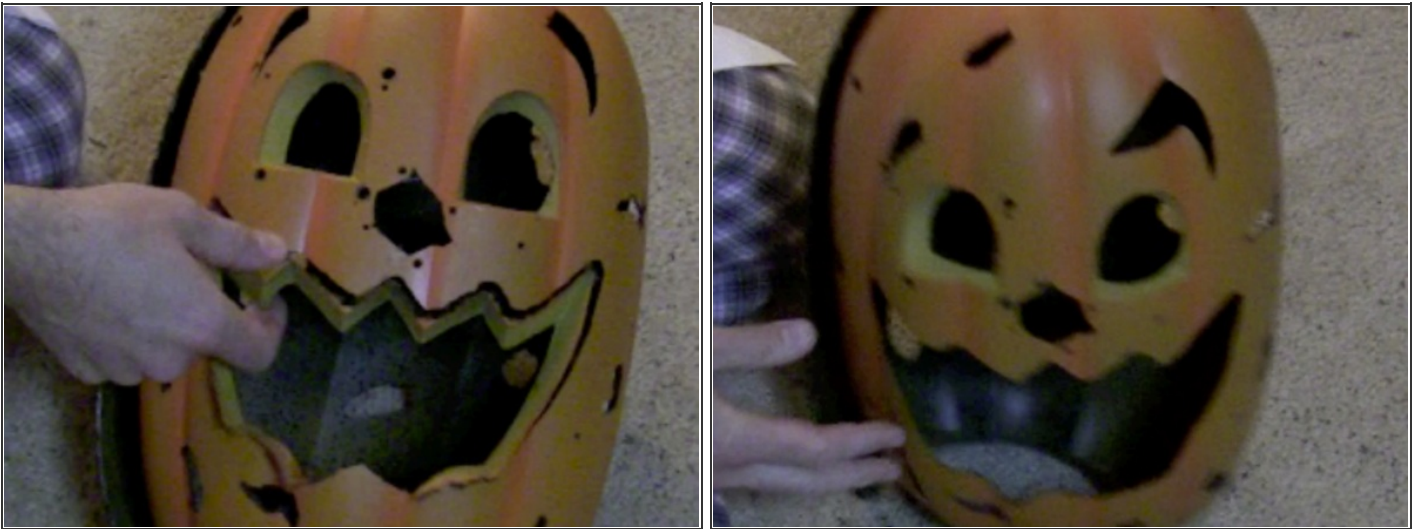
- The most impressive piece of the costume is its pumpkin helmet. It is derived from a \$10 lamp.
- I cut the lamp almost in half, making it open like a clam shell.
- Then I used a rotary tool to cut a hole for my neck.

Step 23



- Cut out random pieces of the plastic. A rotary tool works great for this.
- Patch the holes you just made with aluminum foil from the inside. This will give the pumpkin a Terminator-like look and feel.

Step 24



- The pumpkin looked great for a lamp, but not eerie enough for a cyborg. After some plastic surgery it became more evil.

Step 25



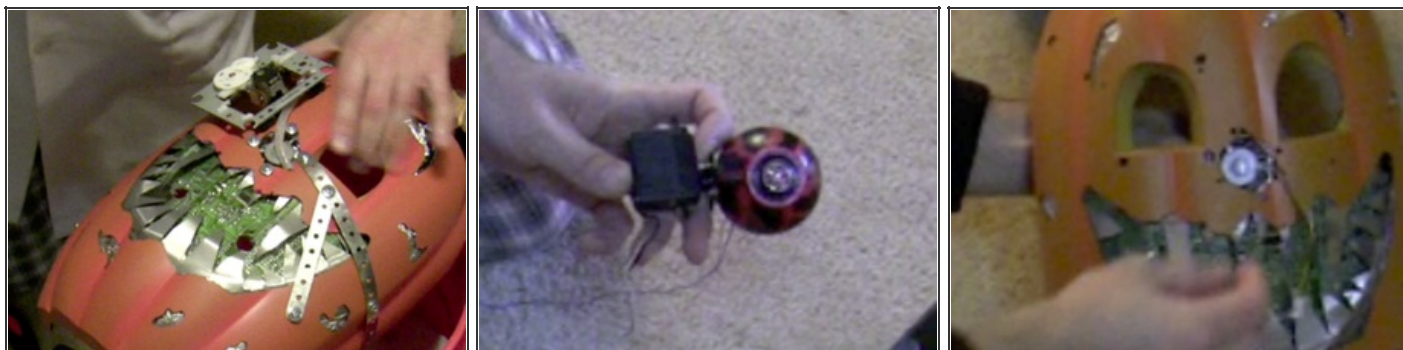
- ... unfortunately, not evil enough, so after plastic surgery I used some aluminum flashing to do the orthodontics.
- The lower jaw is cut from a single piece of flashing.
- The upper jaw consists of individually hot-glued debris from the lower jaw.

Step 26



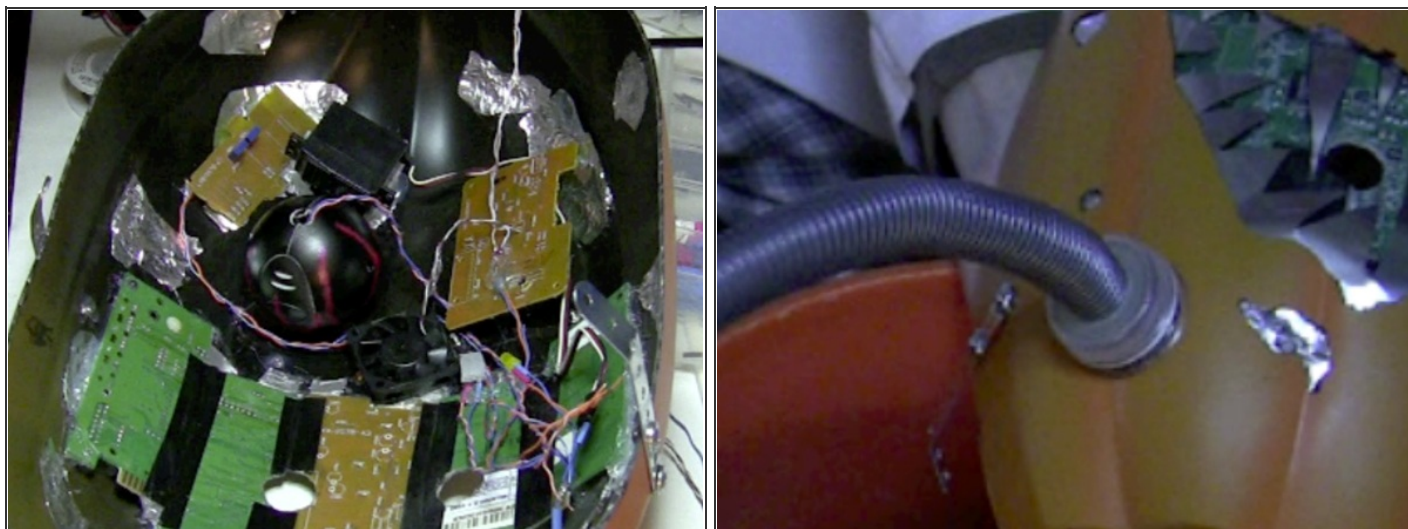
- In order to protect the spectators I bent all the teeth inwards.
- In order to protect the precious one wearing this costume, I also installed five pieces of different PCBs. Five pieces were required instead of one to create this curvy shape that would perfectly align with the helmet.
- Two holes were drilled in the PCBs to let the wearer see and breathe.

Step 27



- I covered both eyes (pumpkin eyes, not human's) with different contraptions.
- The right eye has two LEDs, red and green. They are covered by part of a CD drive containing a DC motor, a bunch of gears and a laser head. It can even be controlled via an H-bridge!
- The left eye was implemented as an ancient webcam with a flashlight inside. I painted the webcam black with red accents and mounted it on a servo so it, too, can be controlled.
- The last piece of electronics on the front side of the mask is a fan. It's like having air conditioning embedded into the costume!
- Finally, two pieces from a Meccano set add a little more charm to this friendly face.

Step 28



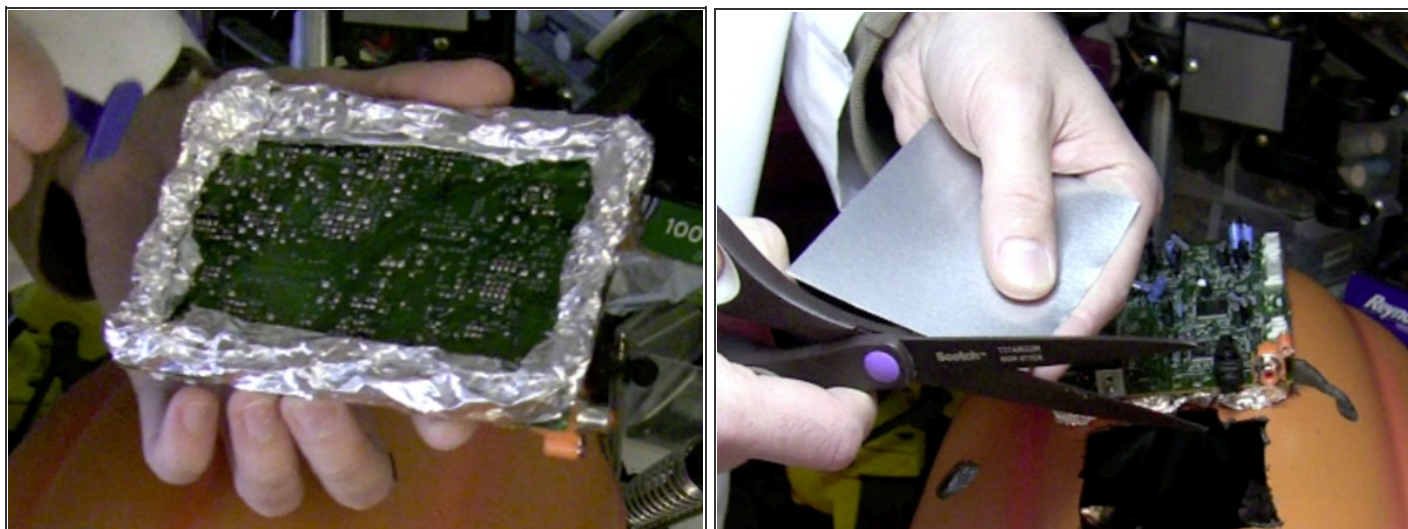
- Inside the mask, I installed a whole bunch of different LEDs. This is where all these wires come from.
- Where do these wires go to? They are soldered to one end of a UTP5 cable that leaves the mask via the "port."
- The port is constructed from the top part of a bottle, so you can unscrew the cap and get access to where all the wires are soldered. And yeah, the cap is also illuminated with an LED. :)

Step 29



- Pretty much as with motorcycle helmets, this helmet requires some padding to fix it on the head. It takes plenty of tests, but in the end a bunch of pieces of foam do the trick.
- I have two strips installed against the forehead, two small pieces on the back, two white pieces on the sides and two more pieces to insulate the mouth area from noises. Why? Keep reading and you will find out.

Step 30



- One problem that emerged during the construction was the pumpkin's size. My son's head turned out to be a bit deeper than the helmet.
- I fixed the problem by cutting out the back side of the pumpkin and installing a piece of flashing on an "aluminum foil standoff." This added the necessary half-inch of depth to the helmet.

Step 31



- The bottom part of the costume had to be very mobile to let the owner to take a break from carrying 10 pounds of recycled materials on his shoulders.
- The solution happened to be a simple one. My son had his Prison Break jumpsuit left over from last Halloween and it perfectly matched the pumpkin's color. We added a few pieces of aluminum and some spiders and the cyborg pants were ready.

Step 32



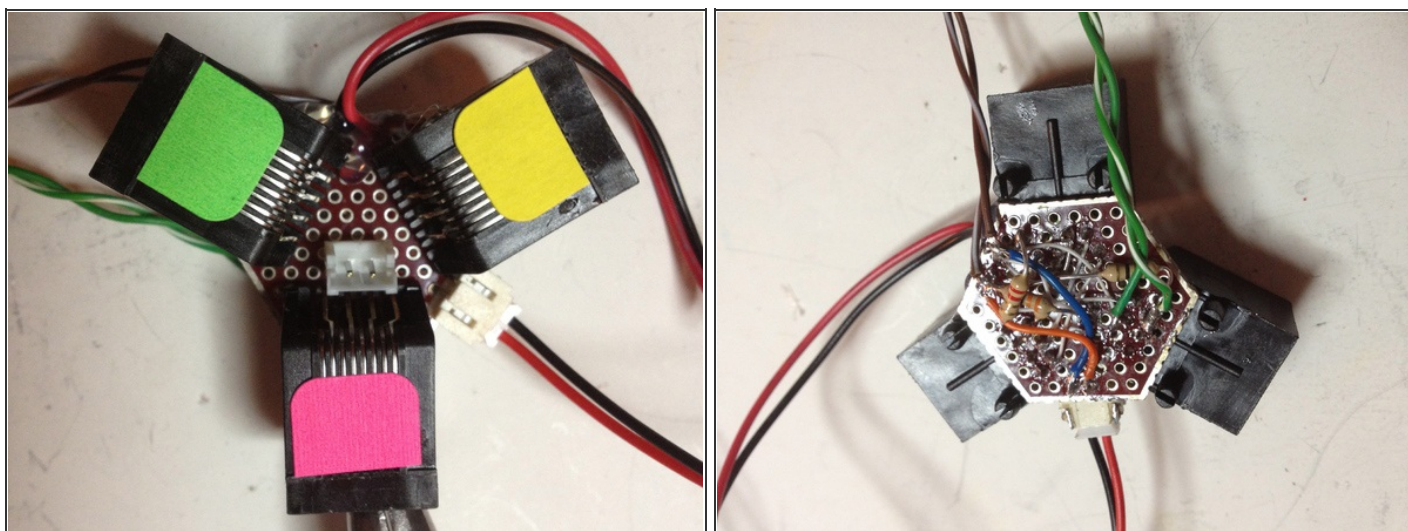
- The last undecorated piece of the costume was the right hand.
- To make it look more mutanty and cyborgy I added a bottle cap, a few pieces of transparent plastic tubing and two LEDs.
- I drilled five holes in the cap for the tubing going to the five fingers, plus one larger hole going towards the wrist.
- Inside the cap I added aluminum foil to prevent light leaking through the top of the cap and installed two fast-flashing RGB LEDs. One was pointed towards the wrist pipe and the other, diffused, towards the finger pipes.
- Finally, I fixed the pipes on the fingers with a bunch of rings made from the flashing.

Step 33



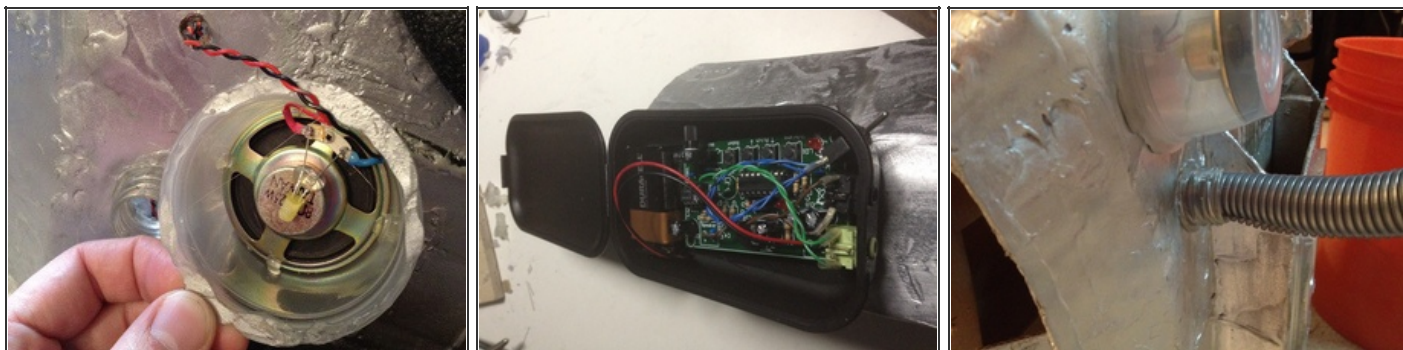
- The result was plain AWESOME!

Step 34



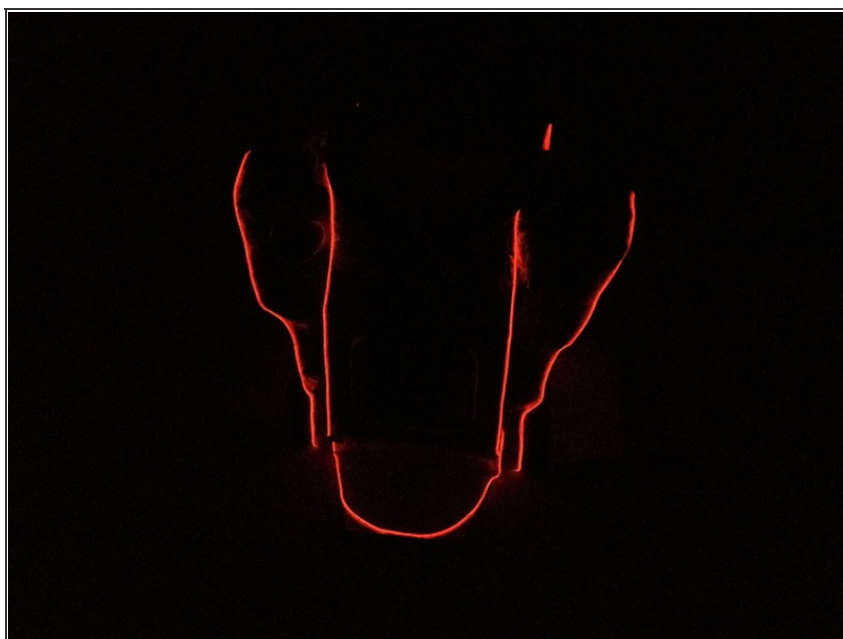
- The final part of the costume is the place where all the wires go.
- All of the wires go to the backpack. It contains all the electronics mounted on a single tiny PCB and a power source consisting of three AA rechargeable batteries. Surprisingly, this was enough to drive the costume for more than 2 hours!
- All UTP5 cables ended in RJ45 plugs. This is a very convenient solution that allows donning the costume piece by piece. It also greatly simplifies debugging.
- I color-coded the ports so that it is easier to find them in the dark.
- The suit also contains a bunch of integrated LEDs and all of them terminate in two JST connectors.
- I don't have a schematic for the mess on the back side of the board, but you don't need one because every suit will have its own layout of LEDs. Just don't forget the resistors; otherwise, half of your LEDs will burn out very quickly.

Step 35



- There was actually one more completely standalone electrical system in the costume: the voice changer.
- I mounted it on the left shoulder with velcro tape. The speaker was glued to the armor near the port where the cables from the helmet enter the main armor. Finally, the microphone was glued into the helmet and its wires were routed along the other cables.
- In parallel with the speaker I added an LED to add visual effects to the cyborg's speech.

Step 36



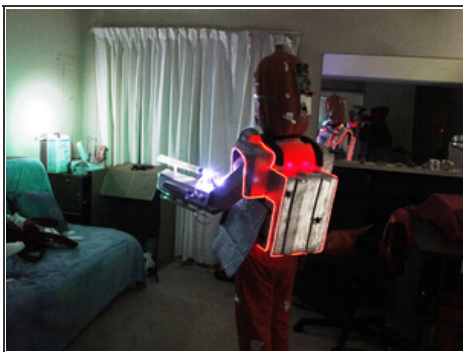
- The board actually carries four JST connectors. Two supply the armor LEDs, one provides power to The Claw and the last one leads to the inverter for the EL wire. The suit has 6m (18ft) of EL wire hot-glued around the main armor.

Step 37



- After three weeks of tries, failures, mistakes and successes, my son was the proud owner of the coolest Halloween costume in the neighborhood. Check out a few photos of what it looked like.

Step 38



- And a few more pictures ...

Pumpkin lamp

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